Billy’s 1997 Chevy S10 Repair

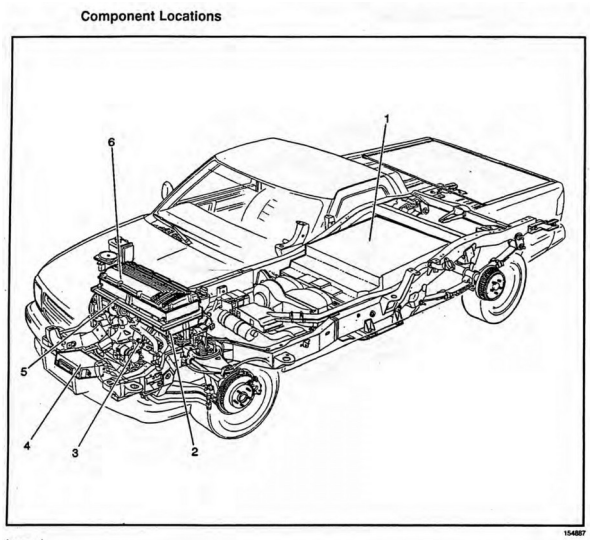
In order to get the 1997 Chevy S10 EV up and running again we must do the following:

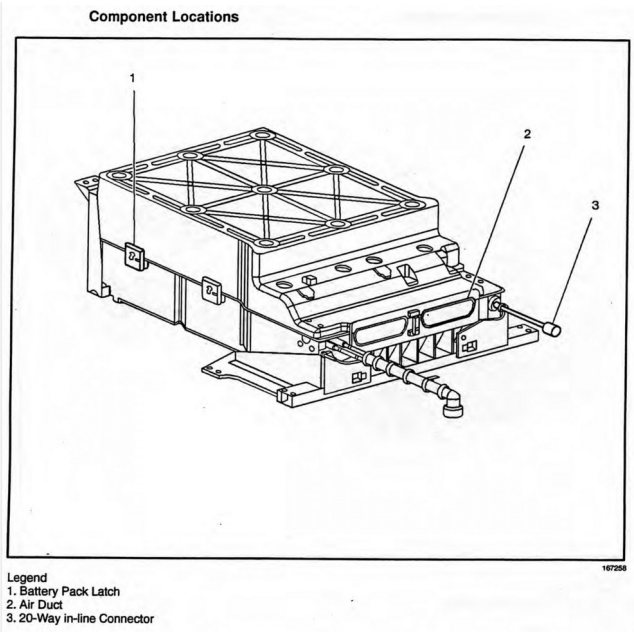
1. Install 12 volt battery and check MagneCharger
    a. Thanks to Steve - we got the old 12 V out. I bought a new one and things light up! **$100**
    b. Thanks to Ethan - purchased a Plug and Dolly for one of the MagneChargers and the thing lights up when you pull the paddle out! **$40**
        i. Installed a NEMA 14-50 plug (the 4th conductor - neutral - is not used)
        ii. Weighs ~75 pounds
2. Check DTC with Genuine GM Tech2
    a. Thanks to Tommy Faragalli - got a Genuine GM Tech 2 with codes for the truck **$0**
3. Replace Capacitors
    a. Buy 4
    b. Replace them
4. Remove Battery box under cab
    a. Remove Bed. Jack up the truck as high as possible (2 ft), drop the box on a pallet jack or hydraulic table. Slide out the left side. Lift back of S10 with engine hoist if need more clearance.
5. Replace high voltage battery
    a. NiMH (near impossible)
    b. Lead Acid
    c. Lithium (the right way)
        i. New BMS (Orion or maybe SimpBMS)
        ii. New Charger(?)
6. Replace BPCM software
    a. And fix the dash depending on which software is installed
7. It might drive!

See details below:

Battery Box Removal

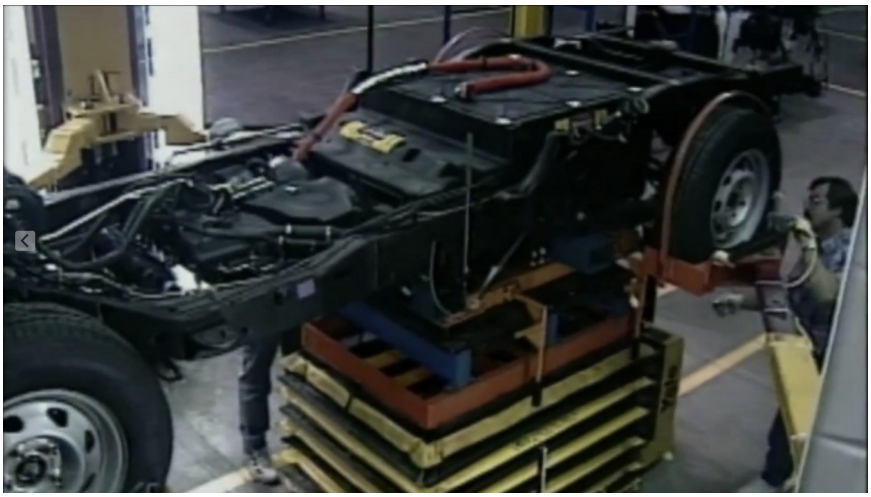
Location in the Truck





Removal

The battery box must be removed from underneath the frame. There are bolts holding the box to the frame on all sides:



Wires stick out of the front of the box.

Reinstalling battery. Once truck is on horses, Battery can be removed from the left side. Or function is extensive to clear certain obstacles such as rear axle and cooling ports.

Then the box will be able to be opened in half once it is removed.

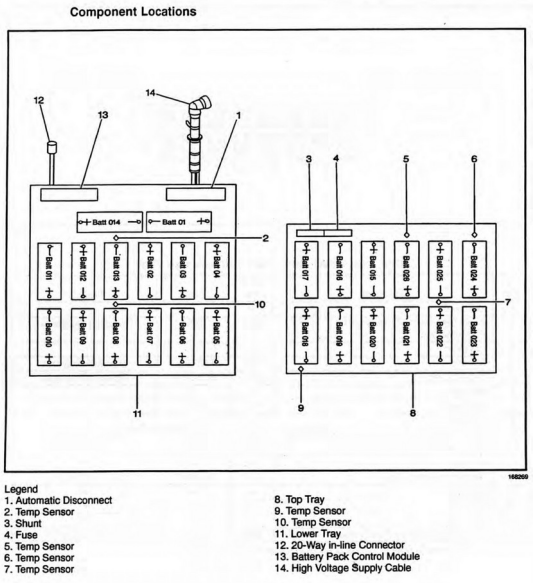
http://www.tzev.com/1998_s10e_ev95installation.html

New Batteries

Lead Acid Batteries

Requires TIS 2000 to flash the charging profile to Lead Acid.

Layout of the batteries, in two layers:



NiMH Batteries

Restore existing batteries or find new ones (impossible)

EV Bones upgraded most trucks to NiMH:

An image of an S-10 NiMH battery pack with the sealed cover removed is shown below.

The batteries are arranged as twelve on top, and fourteen on the bottom. The center support shelf covers the lower deck of batteries in the pack.
An S-10EV NiMH pack has up to 29 kWh of energy when fully charged.

The GM/Ovonic NiMH EV battery was purpose designed for the EV1 and S-10EV.
Each battery is composed of eleven individual cells (one shown at right) connected in series to form a completed battery module. Battery voltage is 13.2v, and rated current is 85Ah @25 degrees C.

When compared to the energy density per pound of valve regulated lead-acid, the NiMH battery provides nearly 2X the available energy, and 3X service life.

NiMH has it's limitations. Heat directly affects life and performance of these batteries.
Careful charge management is required in order to achieve maximum capacity and service life. Thermal management (cooling) is required in both charge and discharge cycles.

Lithium Batteries

See discussion: https://www.diyelectriccar.com/threads/97-chevy-s10e-computer-hack.193945/

Tesla Batteries

Not done before?
SimpBMS

Issue: fitting into the Box

Tesla Model 3 modules are rectangles (4)

- All four modules are 11.5 in (292 mm) wide and 3.5 in (90 mm) thick. 2 x small modules are 67.5 in (1715 mm) long and weight 191 lbs (86.6 kg) each
- 3 x long modules are 73 in (1854 mm) and 207 lbs (98.9 kg).

Chevy Volt batteries

Swap done in 2011
https://ecorenovator.org/forum/showthread.php?t=4885

BMW i3 batteries

Swao done in Germany in 2020 https://www.diyelectriccar.com/threads/chevrolet-s-10-ev-battery-upgrade-to-bmw-i3-modules.204290/

Use SimpBMS

8 x 2017 BMW i3 battery module.

Nominal voltage; 48 v x 8 = 384 volts

22kwh, 60 ah ~ 50 miles range
33kwh, 94ah ~ 70 miles range
42kwh, 120ah ~ 110 miles range

Cells are made by Samsung SDI.
Each module is 44.16V nominal; 12 cells in series at the Samsung spec nominal voltage of 3.68V/cell.

Samsung specifies the maximum charge voltage to be 4.15V/cell or 49.8V for the module.

150A Continuous Discharge
409A Peak Discharge
72A Continuous Charge
270A Peak Charge

Approximate Module Dimensions:
Length: 16.33 inches (41.5cm) including mounting legs
Width: 12.20 inches (31cm)
Height: 5.91 inches (15cm)
Weight: 61.75lbs (28kg)

Wiring:

- Connect all modules in series: 44 v x 8 = 352 v
- Attach total voltage to total voltage
- Attached each battery voltage to total voltage / 26 with resistor

Arrangement:

- 4 on bottom
- 4 on top

Arranged Approx Dimensions: 33 in x 25 in x 12 in

104 x CALB LiFePO4 Cells

Nominal voltage; 3.2 v x 104 = 332.8 volts

60 ah ~ 50 miles range
90ah ~ 70 miles range
100ah ~ 90 miles range
120ah ~ 110 miles range
200ah ~ 175 miles range

Arrangement

Thow 5.6L * 2.6W * 8.6H in

Other Stuff:

Richard Hatfield (of Lightning Motorcycle fame) successfully converted a truck to Li-Ion

Replace Capacitors

Jose Movarec

Hello Kevin and everyone!

If you read carefully the past threads regarding the capacitors, it is really important to change them to make sure they do not burst like a grenade and destroy the PIM. I think last capacitors Jeff had, are owned by Don. I could not buy them from him, so I found a perfect replacement available in the market. They are exactly the same size, bolt pattern voltage and capacity. You need 4 of them. You can find them here:

http://www.newark.com/nichicon/lnc2w222mseg/aluminum-electrolytic-capacitor/dp/27T9751?ost=LNC2W222MSE

I replaced them on my truck on November last year. It is not difficult to do the swap. If you have any questions ask me.

Regards

Jose Movarec

https://www.digikey.com/en/products/detail/nichicon/LNC2W222MSEG/2538653?WT.z_cid=ref_neda_dkc_buynow&utm_source=ecia&utm_medium=aggregator&utm_campaign=buynow

LiFePO4 - CALB Cells

Jack Parette

I have been working on a truck that was doa and I never drove it yet. Purchased 100 calb 60s (same power half the weight, suspension popped up 1.5"). Made a spoofer circuit for feedback of the 26 12volts. Having some problems with high voltage interlock faults. Have been studying how to modify calibration data. And am interfacing the uart bus with laptop/tech2. Going very slow. Busy with family and job plus don't want to brick components.

I have CA60s. Got them from EVTV. 100 in series provides very close voltage (320v) and total power (19KW) (and SOC calcs) to the original pba pack, with about half the volume and weight, the current (amps) cabability is higher as well. The 60 is how many continuous amps in one hour (ah). These cells can do 600amps (10C) for 30 seconds with very little voltage sag. Our trucks won't draw more than 400 amps (fuse). Or if you want to consider the motor as 85KW, thats about 265amps. Its all about how much you step on the pedal, and how much of a load there is. The software allows for 440 amps max (I'm not sure for how long), but reduces power (to motor) as voltage drops or sags. The cells are the same width as the old ones, and fit pretty good with some room left in the pack. I'll post a pucture later. This lifepo4 chemistry is not so energy dense as OEM li-ion cars, but is quite safe, and have great current capability without the need for cooling. They will need to be above freezing, if charging/discharging.

Hello all,

Here is how I laid out my pack.
They are taped together to make "modules". Only 1st level is used. I will be looking for some kind of foam rubber to lay on top, to keep them from bouncing up, with the lid compressing that. Currently, I am spoofing the 26 12v sense leads with 13 dual channel dc-dc converters 12v-12v. It is powered and adjusted from a separate source for now. It works well, providing proper feedback on Tech2, as well as affecting voltage guage in dash. I do plan add a voltage divider /26 +/- adjustabilty for fine calibration or even purpose offseting, feeding from total pack voltage, in order to get true(r) feedback to BPCM. These cells will use the bottom balance with NO BMS stategy according to the way Jack Rickard at EVTV and many of his followers has proven.

Hats off to Jose for sending me down the path for replacing Caps and resistors. I have been taking pics and will document this procedure to post here.

Jack

Post about Tech2/TIS →
https://pairlist5.pair.net/mailman/private/s10-ev/2012/002555.html

Lead Acids

Here are the details on how the 1997 model S-10EV was programmed to operate with GM/Ovonic NiMH batteries, even though GM never offered this model year vehicle with a NiMH battery configuration. I tried to write it for easy understanding. So I explained what I did to these trucks to make them NiMH first, and then how to back it out.

The 1997 and 1998 model S-10 electric trucks have one distinct difference in their electrical design. The 1998 model includes an instrument panel that is controlled entirely by the one-wire class2 data bus, whereas the 1997 model uses discrete PWM control of all lights and gauges through the BPCM (Battery Pack Control Module). Coincidentally, this is the same module that contains the battery pack chemistry programming.

Both model years include the same heating/cooling pack management hardware and software. The NiMH batteries were just not ready in time for the 1997 model year.

To get around this limitation; the 1997 model S-10, when the battery pack is upgraded to NiMH, must be programmed as a 1998 model S-10 using GM factory NiMH BPCM software I downloaded from the GM TIS database. There is no 1997 model NiMH software profile available.

If you reprogram a 1997 model truck with 1998 BPCM software for NiMH, the gauges will not work. Basically you're left with a dead instrument panel, and you would think the truck is inop. It's not, just the instruments are dead.

The 1997 model truck instrument panel is driven by discrete signal lines originating from the BPCM, and buffered by the Vehicle Instrument Module (VIM) beneath the dash on the passenger side of the vehicle.

To restore instrument panel operation, I have added a small processor

driven circuit board inside the 1997 model VIM module. This new circuit board is connected to the class2 data bus, receiving the commanded signals to the 1998 model instrument panel, and generating the appropriate PWM gauge and idiot light information just like the BPCM sent discretely to the VIM.

So, your 1997 NiMH S-10EV is now a 1998 S-10EV, at least in software.

You can back the NiMH software out of the truck using two different directions:
(1) Reprogram the S-10EV BPCM back to using the original VIN data with PbA battery configuration. This is accomplished using the GM TIS database, and a GM Tech II programming tool. The VIM module will need to be removed and opened up. Then the new processor daughterboard removed for the VIM to return to PWM control by the BPCM.

(2) Reprogram the S-10EV BPCM with 1998 model PbA battery software. This method does not require removal of the processor daughterboard from the VIM, since the 1998 model BPCM software commands the instruments using class2 data.

In addition to the work described above, a "technology resistor" located inside the battery pack must be replaced whenever the battery chemistry profile has changed. It functions as a secondary confirmation in the event a shop technician mistakenly programmed the BPCM with the wrong battery chemistry. The technology resistor value for the NiMH program is 96K ohms. The technology resistor value for the Panasonic PbA program is 133K ohms. The resistor value must correlate to the battery chemistry at time of programming. Meaning; change the resistor value before you program the BPCM to PbA.

Jeff Thomas:

> All trucks that are NiMH, whether they were original, or converted later, can be reprogrammed for PbA battery operation.
>
> To reprogram the truck it does require the GM Tech2 scan tool as well as the GM TIS application.
>
> Due to health issues, I have donated the official <grin> reprogramming laptop with the special TIS application to Don Blazer, who will be the keeper of the keys on module reprogramming from here on. Additionally, if you have an ancient laptop running win2k, and it has a DB9 serial port, you could acquire the TIS program yourself

and install it on your own peecee.

**To do this you query the vehicle for its VIN # via the Tech 2. You then link the Tech 2 to the GM SPS system and query for BPCM calibrations [there
are four possibilities for a '97 VIN; the 1) Delco cal., 2) Panasonic PbA cal,, 3) Ovonic NiMH initial install cal., and the 4) Ovonic NiMH cal.].
You then download the calibration you desire to the Tech 2, re-connect the Tech 2 to the vehicle and upload the calibration to the BPCM. Note that the
#3 install cal. is only for the first charging cycle on newly installed Ovonic NiMH units.**

http://www.monstaliner.com/monstaliner_photos_video_2.htm

100 amp load
180 ah load

Caveat -> regen (cannot completely charge to fill)

Dimension -> 27x33x14

60ah calb cells -> Orion BMS + Elcon Charger (cannot) (longest life is 80%->40%)

Regen → too many amps. Use relay, cut off temp sensor to shut-off charging.

White Delco → original lead acid 1997 (AGM)
Panasonic→ original lead acid 1999 (higher AH)

10% over charge to balance the cells.

Real sensitive to ground faults

RAV4 -> some modules were cooled more than others - #2 module gets hot.

Back row near fan good.

Related posts:

1. **Solar Panels on the Electric Truck**
2. **S-10 Electric Pickup**
3. **Lead Acid to Nissan Leaf Pack upgrade process**

This entry was posted in **Uncategorized** by **Jay**. Bookmark the **permalink**.

2 THOUGHTS ON "S10 PICKUP TILT BED"

Wes Carter on **September 20, 2019 at 9:58 am** said:

Can you give me the part no#, brand and extended length info on the lift struts on your "EV S-10"? Thank you so much for your time. Wes

Reply ↓

Jay
on **September 21, 2019 at 3:57 pm** said:

Hi Wes,

The extended length is 35.5″, with approximately 10.5-11″ of extension. About 24-25″ when compressed.
Model: GGS38-200-J

H.A. Guden Co Inc
99 Raynor Ave, Ronkonkima NY 11779
1-800-3-HINGES FAX 631-737-2933

They have replaced the chrome ones with Black Nitride Rods, so the equivalent model would now be:

Gas Spring
GGN38-P1=200 LBS 15.00″ STROKE EF100A-02B W/CLIPS, BLK NITRID
Item: GGN38-200-J

https://www.guden.com/pages/PDF/ggs/ggn/ggn38-200-j-a.pdf

If you will have anything on top of the bed (such as a tonneau cover or camper top) you may need to use ones with more than 200 lbs of pressure. Note that I have retaining clips inside the bed, so it won't "pop up" after going over a bump in the road.

Reply ↓

Leave a Reply

Your email address will not be published. Required fields are marked *